GEORGIA INSTITUTE OF TECHNOLOGY
Engineering Experiment Station

PROJECT INITIATION

Date: 9/1/70

Project Title: Ecology Studies and Effects of Waste Treatment Programs

Project No.: A-1282

Project Director: Dr. R. S. Ingols

Sponsor: Parker Engineered Chemicals, Inc.

Effective . . . . . September 1, 1970 . . . . . Estimated to run until: . . . . . Open . . . . . .

Type Agreement: . Industrial Research Project . . . . . Amount: $ 1,200.00 . . . . . .

Reports: As necessary to report findings.

Contact Person: Mr. Frank Parker, President
Parker Engineered Chemicals, Inc.
Suite 901, MONY Building
1655 Peachtree Street, N. E.
Atlanta, Georgia 30309

Assigned to . . . . Chemical Sciences & Materials . . . . . Division

COPIES TO:

- ☐ Project Director
- ☐ Director
- ☐ Associate Director
- ☐ Assistant Director(s)
- ☐ Division Chiefs
- ☐ Branch Head
- ☐ General Office Services
- ☐ Engineering Design Services
- ☐ Photographic Laboratory
- ☑ Research Security Officer
- ☐ Accounting
- ☐ Purchasing
- ☐ Report Section
- ☐ Library
- ☐ Rich Electronic Computer Center
- ☐ _____

Harty
300 A 1282

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

Date: July 1, 1976

Project Title: Ecology Studies & Effects of Waste Treatment Program

Project No: A-1282-017

Project Director: Dr. R. S.Ingols

Sponsor: Parker Engineered Chemicals, Inc.

Effective Termination Date: 6/30/76

Clearance of Accounting Charges: N/A - all charges have cleared.

Grant/Contract Closeout Actions Remaining:

NONE

_ Final Invoice and Closing Documents
_ Final Fiscal Report
_ Final Report of Inventions
_ Govt. Property Inventory & Related Certificate
_ Classified Material Certificate
_ Other _____

Assigned to: Applied Sciences (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director—EES
Accounting Office
Procurement Office
Security Coordinator (OCA)
Reports Coordinator (OCA)
Library, Technical Reports Section
Office of Computing Services
Director, Physical Plant
EES Information Office
Project File (OCA)
Project Code (GTRI)
Other _____

CA—4 (3/76)

Project: A-1282-005

REPORT ON SAMPLES

TO

PARKER ENGINEERED CHEMICALS

Wilson Laurel Farms	
TOC (total organic carbon)	52 mg/1
Total coliform	1600/100ml
Fecal coliform	79/100ml
Fecal strepticoccus	23/100ml

REPORT TO

PARKER ENGINEERED CHEMICALS, INC.

REGARDING FUMEHOOD PIPING SAFETY

Robert S. Ingols

The University of Georgia - Conner Hall is to be renovated. At present, an Agronomy Science laboratory must be dismantled. The laboratory hoods have been used for drying and ashing plant and soil samples. The process of ashing is carried out in a concentrated acidic medium first with a sulfuric-nitric acid mixture followed by a small volume of perchloric acid. The sample is heated to drive off the excess perchloric acid. The fumes of nitric perchloric acids are one part of the cause of the potential explosion hazard. The volatile organic matter, which is produced by drying the plant material would provide the other factor of potentially explosive matter in the fumehood exhaust system.

Five hoods are tied directly to the single exhaust fan with its exhaust stack. A rough diagram of the system is given in Figures I and II. The collection system of Figure I has had perchlorates used in three of the five hoods so that the collecting system is therefore potentially dangerous. The discharge system of Figure II also has a potentially dangerous section.

There is no way to examine or evaluate the hazard in the collecting ducts from the three chemical hoods without partially dismantling the system which is used almost continuously. The Professor of Agronomy was most anxious to maintain continuity of his research program. A technician or student was drying and ashing samples while we were there. The pump discharge-piping

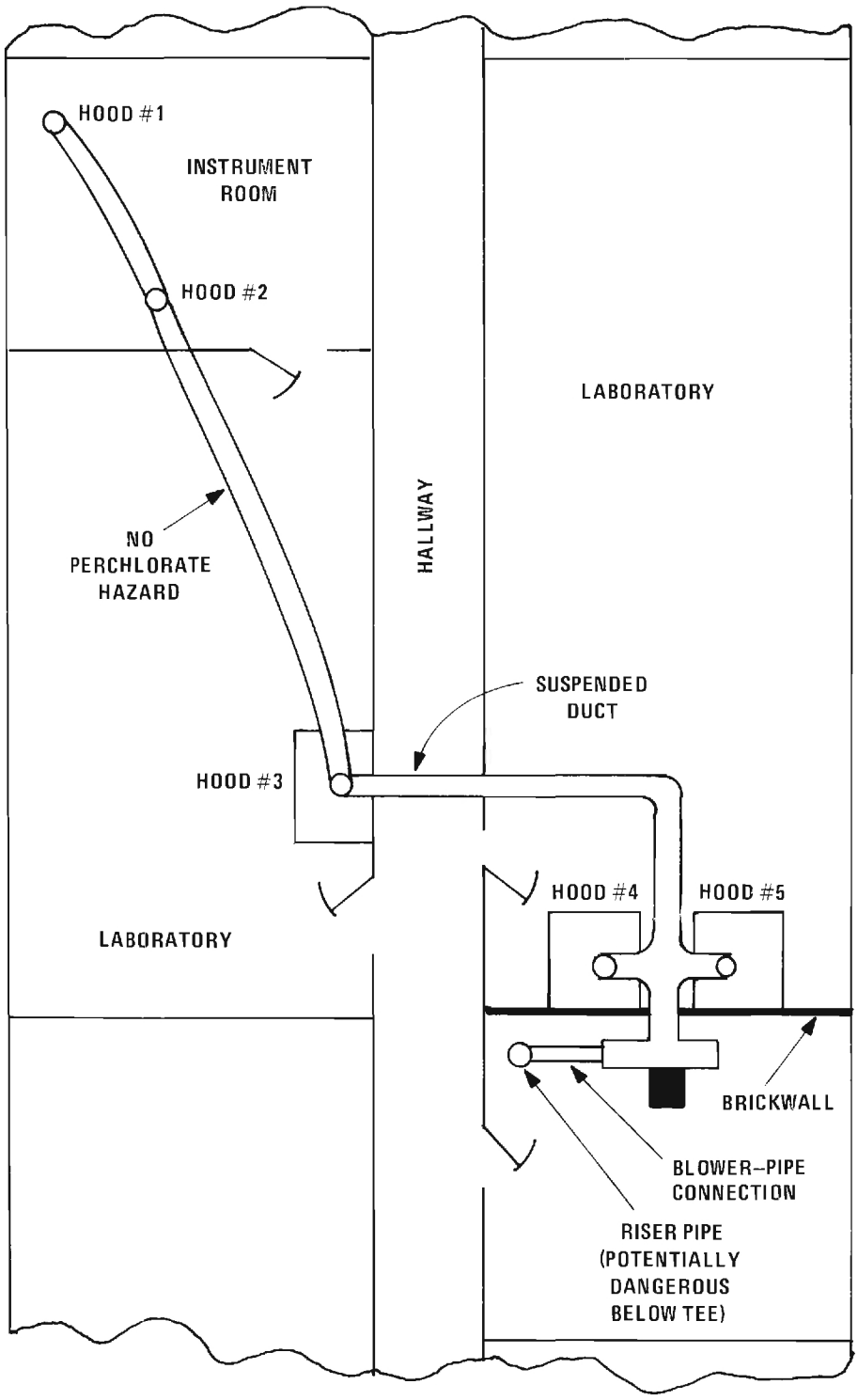

Figure 1. Collection System of Piping.

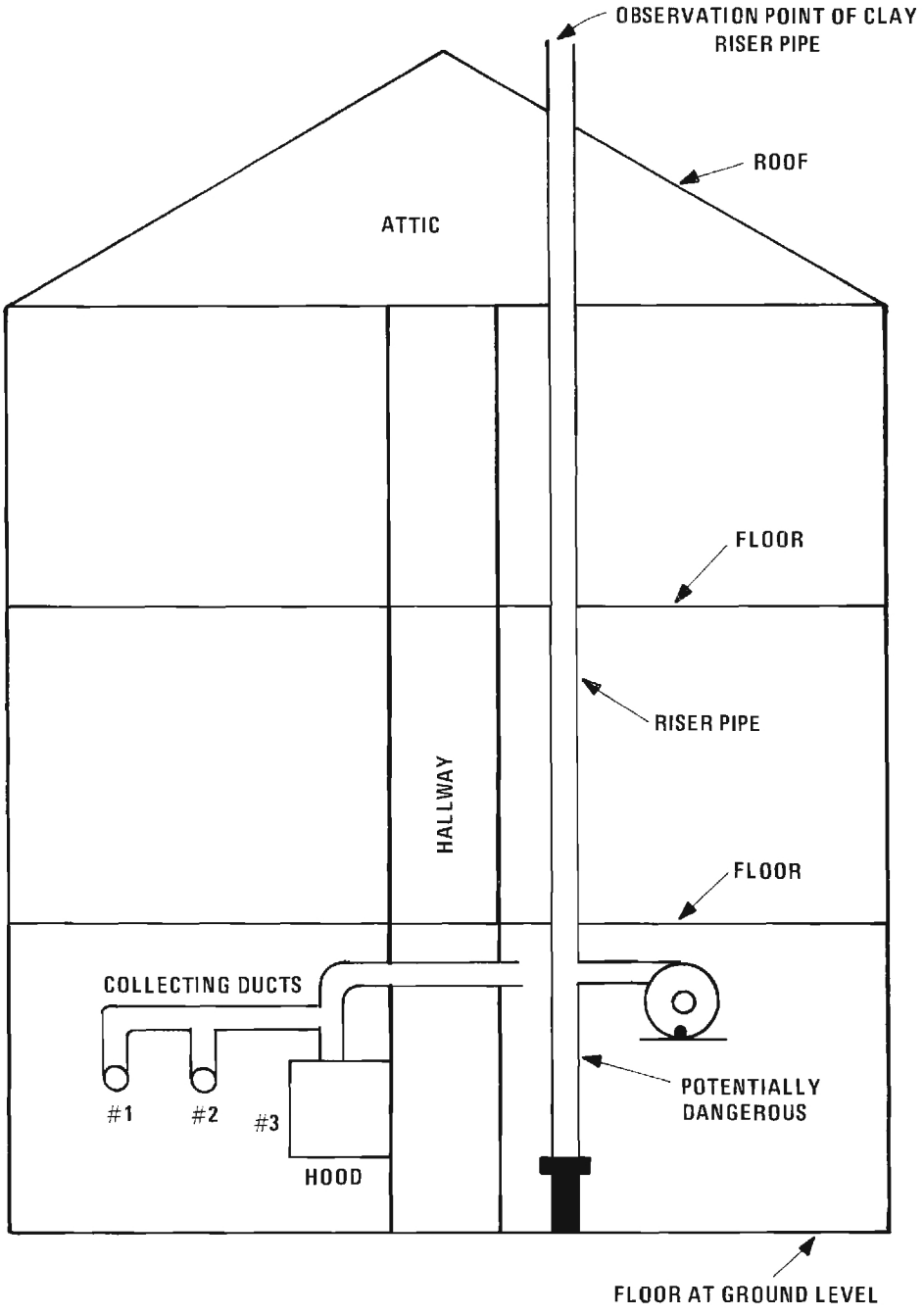

Figure 2. Partial View of Collecting System of Asbestos Duck Work and Blower with Discharge Pipe. Points of Potential Hazard.

union provides a possible entry for careful examination of the collecting ductwork of Figure I. The union between the air blower discharge to the asbestos or clay pipe section to the clay pipe riser can be carefully removed when the system has been discarded by Agronomy (when they have been moved to new quarters). With this port of observation, visual inspection can be made as to the danger of proceeding with or without careful flushing.

The cross tee located above hoods #4 and #5 of Figure I should be considered potentially hazardous. This can be examined and evaluated when the blower has been examined and removed so that a port of observation is provided. Because the cross tee area of the system provided the explosive matter which brought the hazard to the attention of the University System authorities, I believe that this should be steam cleaned without inspection or inspected and a decision rendered as to the safe method of proceeding at that time. Part of my reason for suggesting steam cleaning without inspection of the collecting ducts rests with the danger to skin and clothes of personnel handling the piping. While my instructions were limited to an examination of explosion hazards, the conditions of hoods #4 and #5 give mute evidence of the destructive power of the acids used in the hoods. The interior surfaces of the asbestos piping can contain enough free acid to severely burn the skin and/or damage the clothing of anyone handling the pipe. Areas of the interior of the pipe where cracks occur such as pipe joints will be particularly dangerous.

An inspection of the clay riser pipe from the opening on the roof showed no material adhering to the pipe faces as far down as the entrance of the blower discharge. No danger was observed on the interior surface of the riser pipe, but it was not possible to observe the section below the tee. There is the presumption of a strong potential hazard in the supporting sec-

tion of clay pipe between the blower discharge tee and the floor as shown in Figure II. It is hollow and may be a zone of collection of condensed perchloric acid and organic matter.

Recommendations

When the system is no longer needed, two alternative procedures are possible:

(1) Open the union between the pump and the discharge pipe for observations and then a decision can be made as to whether to steam clean and flush the riser support or

(2) Open the union and steam clean the collection system through the opened union. Steam would enter the pump and go through the collecting ducts into the hoods. This would remove the danger from acids of handling the collecting ducts during the dismantling. Water can be used to flush the supporting section of riser pipe.

Care should also be used in handling the interior surfaces of the asbestos pipe from hoods #1 and #2 unless radiation detectors show no adherent radioactivity from the flame analyzers of hoods #1 and #2.

A-1282-008

REPORT TO

PARKER ENGINEERED CHEMICALS, INC.

REGARDING FUMEHOOD PIPING SAFETY

Robert S. Ingols

At the request of Mr. Fred Branch of the Board of Regents, I flew to Augusta on 28 January and was met at the airport by Mr. Chris Williams of the Georgia Medical College. Dr. Singley, Professor of Biochemistry and administrator of the department which had used the building, Decar Hall, to be renovated, joined the group to examine the hoods and ductwork. Two people from Campus Safety and a member of the Physical Plant Department were also present.

Dr. Singley pointed out 16 hoods in the building. Six had not been used with acids and were considered safe for dismantling by common labor. Acid had been used in eight hoods and the evidence of corrosion indicated that cleaning would be required for safe handling by common labor. Two hoods had had perchloric acid used and would obviously require cleaning before dismantling. The rooms with hoods requiring cleaning are numbered

101	
102	
104	
107	with 2 hoods
108	
109	with a blower on the roof
112	
114	
208	to be monitored for radiological danger at the time of steam cleaning. If radiologically hot, decisions as to handling will be made at that time.

The rooms with hoods requiring no cleaning before handling by local labor are

124	128
126	129
127	210

It should be noted that the building is a low two story structure with a flat roof, making access to the hood discharges relatively simple. Two days should be adequate to clean the hoods for dismantling by common labor.

Respectfully submitted,

Robert S. Ingols,
Research Professor